



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

REVIEWS.

HUXLEY'S CLASSIFICATION OF ANIMALS.*—This is not a new work, but a republication, without revision, of the six lectures on the classification of animals, which form the first part of Professor Huxley's "Lectures on the Elements of Comparative Anatomy," published in 1864. It is perhaps the most compact, clearly written and modern text book of zoölogy, from the side of comparative anatomy, that is in the market, and we recommend it for study to be consulted with Agassiz and Gould's *Principles of Zoölogy*, and Milne-Edwards' *Zoölogy*. A large number of the admirable wood-cuts are original, the book is beautifully printed, and to us the perusal of the work has been a great treat. The author's style is clear and terse, and the writer, withal, so frank and outspoken, that we feel strongly the personality of his clear headed, sturdy intellect, though less far reaching and penetrative often, than clear sighted and decisive.

The author first gives the characters of the twenty-seven classes of animals recognized by him, which occupies one-half of the book. In a succeeding chapter he discusses their arrangement into larger groups, namely, the subkingdoms [branches, or types]. The branch of Vertebrates is retained as Cuvier left it. As regards the branch of Articulates, the author is disposed to break it up into two branches, *i.e.*, the ANNULOSA (Insecta, Myriapoda, Arachnida, Crustacea, and the Annelida); and the ANNULOIDA (Echinodermata and Scolecida). Cuvier's branch of Mollusca is subdivided into the MOLLUSCA and MOLLUSCOIDA (Ascidians, Brachiopods and Polyzoa). The branch of Radiata is subdivided into the ECHINODERMATA and CŒLEENTERATA (Acalephs and Polyps), while the Protozoa, the fifth subkingdom, added since Cuvier's time, are subdivided into INFUSORIA and PROTOZOA. Thus out of the wilderness of classes into which we plunge at the beginning of the work, he finally presents us with a hasty view of eight branches, or subkingdoms, of the animal kingdom. All the lower subkingdoms he considers as the equivalents, or nearly so, of the Vertebrates for instance, though he expresses some doubts as to the permanency of one—the *Infusoria*—as a distinct primary division. Here we see carried out to its last term the tendency of the naturalists of the present day to subdivide, and, as it were, to look at nature by piecemeal. The same tendency is manifested in the students of a special order, or family, to multiply orders, families and genera to what seems to us an unwarrantable extent, and is as much due to the want of powers of generalization and combination as to the new facts and improved methods of study, which many claim make such innovations necessary. We are glad to see such iconoclasts arise, and doubts thrown

* An Introduction to the Classification of Animals, by T. H. Huxley, LL. D. London, 1869. 8vo, pp. 147. \$1.50 gold.

over classifications usually accepted, and groups of facts broken up and scattered, believing that another master mind like Humboldt's, or Cuvier's, will arise in the years coming to recrystallize them and demonstrate anew the number and succession of the grand types of the animal kingdom.

Not agreeing with the view of Huxley, who would split up the Mollusca into two branches (believing that though degraded, the Ascidians, Brachiopods and Polyzoa are true mollusks) nor in the "subregnal distinctions of the *Cœlenterata*," which Frey and Leuckart have attempted to demonstrate, let us examine the author's views regarding the classification of the Cuvierian Articulata, and seek the reasons of his adopting Siebold's view that the Vermes (in the Linnæan sense) should be separated as a distinct subkingdom, equivalent to the Vertebrates for instance, and thus the Cuvierian branch of *Articulata* be demolished. In the arrangement of the classes of the Articulates, the author retrogrades nearly a quarter of a century, and in that of the Insects, more than that time. This is due perhaps to his having studied the members of this type less than the others, and being consequently dependent on the labors of other naturalists. The views of Leuckart, which have been so ably seconded by Professor Agassiz, that the Articulates should be distributed into three divisions, or classes, according as the body is worm-like, *i. e.*, a simple cylindrical sac, not subdivided into different regions, as in the Worms; or differentiated into two regions, as in the Crustacea; or three, as in the Insects, is founded upon a much broader and more comprehensive principle in the classification of these articulated animals than any the author suggests in this work. The body of the typical articulate is a cylindrical sac, subdivided by infoldings of the integument into more or less equidistant segments, and the form and relative position of the internal organs are subordinated to this articulated, or segmented, plan. This structure is shown in the higher Annelids, as well as in the Insects and Crustacea, and though less frequently in the lower worms, yet in the tape worm the body is distinctly segmented, and the Turbellaria are too closely allied to the segmented Leeches (*Discophora*) to be placed in a separate subkingdom by a series of negative characters such as the author proposes. The Myriapoda and Arachnida are considered as classes, equivalent to the Insecta and Crustacea. The direct homology of the adult forms of Myriapods and Arachnids with the insects, and more especially the significant facts that the young of these two groups are, when first hatched, hexapodous, and that the embryology of the Arachnids is almost identical with that of the insects, are not mentioned by the author. He also subdivides his subkingdom "*Annulosa*" into the *Arthropoda* (a term proposed by Siebold in 1848) and *Annelida*, for which we could never see any good reason; both Insects and Crustacea in their retrograde genera sometimes assuming worm-like forms, a proof of the unity of type in the three classes. The worms seem to us to stand in the same relation to the insects and Crustacea, as the fishes do to the Mammalia.

Now in subkingdoms, as well as in classes and orders, or families and

genera, there are two series of forms, the higher and the more degraded. In the type of Articulates the Flea is a degraded Mycetophilid, so to speak; the Podura is a degraded Neuropterous insect; the Tardi-grades, by some naturalists placed among the worms, are degraded mites, to be ranked near Demodex; as in suborders so in families, the wingless Boreus is a degraded Panorpa. There is the greatest range of form within these subdivisions, and we judge of the relationship and position in nature of the lower by their relation to other and higher forms. Following out the principles of Prof. Huxley, by looking at the results of his methods of inquiry, we should go back to the times of the first quarter of this century, and assign the flea to a distinct order; also the Stylops, an undoubted Coleopterous insect, to a distinct order (as he really does). With as much reason does the author separate the lower worms (Annuloida) from the Annelida (in the Huxleyan sense), or separate the Echinoderms from the Radiata, and place them next to the Annulosa; and assign the worms to a division equivalent to the Insecta and Crustacea combined (Arthropoda). We would question whether this "conduces to the formation of clear conceptions in zoölogy." Rather do we think that it is a retrograde step to the pre-Cuvierian times of Linnæus and Lamarck, when the animal kingdom was a confused mass of classes and orders, with no glimpses of archetypal forms, or hints of an idea, or plan, combining these classes into grand types.

In the arrangement of the insects we are led back some thirty, or more, years to the times of Kirby and Spence, and Leach, though the author is probably indebted largely to Gerstaecker's classification, in Peters and Carus' Handbook of Zoology, representing, perhaps, the Erichson and Siebold school.

The Coleoptera are placed at the head of the Insects, and the Hymenoptera, Lepidoptera and Diptera are interposed between the beetles and the Hemiptera, though there is so much in common between these two last orders, and the Orthoptera and Neuroptera, in the structure of the imago. Beyond the Hemiptera all is uncertainty and confusion, and the toil of entomologists for the last thirty years seems in vain, as our author clings to the obsolete classifications of over a quarter of a century back. Prof. Huxley still retains the old orders "Strepsiptera" for the Coleopterous family Stylopidae, in spite of the opinion of the ablest and most philosophical coleopterists of the present day; his characters defining the group being mostly negative.

The strangest, and humanely speaking, saddest feature of his classification is recognizing the Neuropterous family, Phryganeidae, as an "order" (Trichoptera), when their affinities to the Panorpidæ are so well acknowledged by the best neuropterists. Why the Neuroptera (in the sense of Siebold and Erichson) are placed above the Orthoptera we are not told. The Orthoptera, according to Huxley, embrace, — *a*, the restricted Orthoptera (Cockroaches, Mantides, Leaf and Stick Insects, Grasshoppers and Locusts); *b*, the Dermaptera (Forficulariæ); *c*, the Termitinæ (the Pso-

cidæ are not mentioned by the author); *d*, the Perlariæ; *e*, the Ephemeridæ, and *f*, the Libellulidæ. Three groups remain, "which do not fit well into any of the preceding assemblages,"—*a*, the *Physopoda* (Thrips) [which are simply degraded Lygæid Hemiptera]; *b*, the *Thysanura* [which are unquestionably degraded Neuroptera], and *c*, the *Mallophaga*, or bird-lice [which again are degraded Hemiptera and are so recognized by many eminent entomologists, beginning with Latreille.] This arrangement, so arbitrary and unphilosophical, the author evidently borrows from Gerstaecker in Peters and Carus' Handbook of Zoology. Again, for what reason are the *Arthrogastra* (Scorpio, Chelifer, Phrynus, Phalangium, and Galeodes) placed above the Spiders (Araneina), when structurally they are so obviously inferior to the latter, as the embryology of the two groups (of which not a word is said) decides with so much certainty?

We imagine the author treats that strange form, Sagitta, much as Thrips and the Case-flies are disposed of, because it does not "fit well" into some other order or class, not agreeing, forsooth, with the ordinary "definitions" of such order or class (these "definitions" are the bane of zoölogy studied as a science.) It is, indeed, thrown into a separate class, the *Chatognatha* of Rudolph Leuckart, and placed between the worms and Crustacea. Would it not be as philosophical to wait until the embryology of this singular form had been studied before isolating it from either the Crustacea (for it may turn out to be a Copepodous crustacean allied to Penella, as Prof. Agassiz has suggested) or the Annelida, where the weight of authority perhaps locates it.

This book, so interesting and suggestive, yet so unsatisfactory, marks a transitional era in zoölogy. Many of the author's views had been published long before the appearance of the present manual, but the volume has been received with such an unquestioning spirit by certain English reviews, that we must enter our protest against many of the author's opinions regarding classification; and if the Cuvierian "branches" are to be demolished, do let us have a reasonable classification substituted, instead of a confused mass of classes and orders, and almost entire disbelief in the existence of archetypal forms, and ideas in creation—for such surely is the tendency of the book.—*To be concluded.*

GUIDE TO THE STUDY OF INSECTS.*—This work, which has been over a year in going through the press, appearing in numbers, has at length been completed and issued from the Naturalist's Book Agency. It comprises 700 octavo pages, with 651 wood-cuts, and eleven plates, illustrating in all 1,238 objects. It is accompanied by a glossary of entomological terms, a calendar of the monthly appearances of insects, and a copious index. Regarding the classification adopted the author states in the preface:

"The succession of the suborders of the hexapodous insects is that proposed by the author in 1863, and the attention of zoologists is called to the division of the Hexapods into two series of suborders, which are characterized on page 104. To the first and highest may be applied Leach's

* A Guide to the Study of Insects. By A. S. Packard, Jr., M. D. 8vo, pp. 700. 1869. Naturalist's Book Agency, Salem. Price, bound, \$6.00.